

Appl. No. : 10/772,990
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AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions and listings of claims in the application. The listing of claims presents each claim with its respective status shown in parentheses.

Listing of Claims

1. **(Previously presented)** A force-feel system for providing tactile feedback to a cockpit-flight-controller mechanically coupled to a control surface in a helicopter which does not require apparatus to be inserted into a break in an existing flight control system and which does not require a mechanical spring and a trim-motor, thereby reducing the weight and cost of a force-feel system and making it practical to implement a force-feel system and a stability augmentation system in light-weight helicopters, the system comprising:

a feedback loop around a cockpit-flight-controller, the feedback loop configured to apply a force to the cockpit-flight-controller proportional to a deflection of the cockpit-flight-controller from a first position, the feedback loop including:

a position sensor configured to measure a second position of the cockpit-flight-controller;

a flight control device coupled to the position sensor, the flight control device configured to calculate the deflection and to determine the force based on a shaping function; and

a servo-actuator mechanically connected to and in parallel with a flight control system, the servo-actuator configured to apply the force to the cockpit-flight-controller and to be back-driven by the cockpit-flight-controller.

2. **(Original)** The force-feel system of Claim 1, further comprising an attitude sensor coupled to the flight control device to provide an indication of attitude, wherein the feedback loop is further configured to apply the force to the cockpit-flight-controller based on an attitude error.

3. **(Withdrawn)** A method for providing tactile feedback to a cockpit-flight-controller mechanically coupled to a control surface in a helicopter without requiring apparatus to be inserted into a break in an existing flight control system and without requiring the use of a mechanical spring and a trim-motor, thereby reducing the weight and cost of a

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force-feel system and making it possible to implement a force-feel system in light helicopters, the method comprising:

- measuring the position of the cockpit-flight-controller;
- receiving a signal from a trim switch proportional to a commanded position of the cockpit-flight-controller;
- calculating the difference between the measured position and the commanded position; and
- asserting a force on the cockpit-flight-controller based on the difference between the measured position and the commanded position of the cockpit-flight-controller.

4. **(Withdrawn)** The method of Claim 3, further comprising receiving a stability augmentation signal from a sensor and adjusting the force asserted on the cockpit-flight-controller in response to the stability augmentation signal.

5. **(Canceled)**

6. **(Previously presented)** A force-feel system for an aircraft having a cockpit-flight-controller configured to command a control surface, the system comprising:

- a position sensor configured to measure a position of the cockpit-flight-controller;

 a flight control device coupled to the position sensor, the flight control device configured to command a force at the cockpit-flight-controller as a function of the position of the cockpit-flight-controller; and

 an actuator coupled to the flight control device, the actuator being mechanically coupled to and in parallel with the cockpit-flight-controller and the control surface.

7. **(Previously presented)** The force-feel system of Claim 6, further comprising a trim switch configured to define a trim position of the cockpit-flight-controller.

8. **(Previously presented)** The force-feel system of Claim 7, wherein the flight control device is configured to calculate an error corresponding to the difference between the trim position and a current position of the cockpit-flight-controller.

9. **(Original)** The force-feel system of Claim 8, wherein the flight control device comprises a shaping function configured to correlate the error to the force commanded at the cockpit-flight-controller.

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10. **(Original)** The force-feel system of Claim 6, further comprising a stability sensor coupled to the flight control device, wherein the flight control device is further configured to define a commanded vehicle state corresponding to a first stabilization signal received from the stability sensor.

11. **(Original)** The force-feel system of Claim 10, wherein the force-feel system is configured as an attitude-command-attitude-hold stability augmentation system.

12. **(Withdrawn)** The force-feel system of Claim 10, wherein the force-feel system is configured as a rate damper stability augmentation system.

13. **(Original)** The force-feel system of Claim 10, wherein the flight control device is configured to calculate an error corresponding to the difference between the commanded vehicle state and a second stabilization signal.

14. **(Original)** The force-feel system of Claim 13, wherein the flight control device is further configured to command the force at the cockpit-flight-controller as a function of the error.

15. **(Original)** The force-feel system of Claim 6, wherein the actuator comprises a motor configured to receive a signal from the flight control device proportional to the commanded force.

16. **(Original)** The force-feel system of Claim 15, wherein the actuator further comprises a gearing device coupled to the motor, wherein the gearing device is configured to provide mechanical advantage between the motor and the cockpit-flight-controller and to be back-driven by the cockpit-flight-controller.

17. **(Original)** The force-feel system of Claim 15, wherein the actuator further comprises a clutch coupled to the gearing device, wherein the clutch is configured to connect and disconnect the commanded force to the cockpit-flight-controller.

18. **(Canceled)**

19. **(Previously presented)** A force-feel system for a helicopter comprising:
first means mechanically coupled to a control surface for allowing a user to command the control surface;
second means for determining a deflection of the first means; and
third means coupled to and in parallel with the first means for providing feedback to the first means, wherein the feedback is proportional to the deflection.

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20. **(Currently amended)** The force-feel system of Claim 19, wherein the second means is configured to measure a relative position of the first means, cockpit-flight-controller.

21. **(Previously presented)** The force-feel system of Claim 1, wherein the position sensor is configured to measure the second position relative to the first position of the cockpit-flight-controller.

22. **(Withdrawn)** The force-feel system of Claim 1, wherein the position sensor is configured to measure the actual position of the cockpit-flight-controller for at least one of the first position and the second position.

23. **(New)** A force-feel system for providing tactile feedback to a cockpit-flight-controller mechanically coupled to a control surface in a helicopter which does not require apparatus to be inserted into a break in an existing flight control system, the system comprising:

a feedback loop around a cockpit-flight-controller, the feedback loop configured to apply a force to the cockpit-flight-controller proportional to a deflection of the cockpit-flight-controller from a first position, the feedback loop including:

a position sensor configured to measure a second position of the cockpit-flight-controller;

a flight control device coupled to the position sensor, the flight control device configured to calculate the deflection and to determine the force based on a shaping function; and

a servo-actuator mechanically connected to and in parallel with a flight control system, the servo-actuator configured to apply the force to the cockpit-flight-controller and to be back-driven by the cockpit-flight-controller;

wherein the force-feel system does not include a mechanical spring or a trim motor.